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Usefulness of low-dose combined spinal epidural anesthesia for a woman with systemic lupus erythematosus, mechanical prosthesis in the mitral valve position, and worsening heart failure presenting for cesarean delivery

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ABSTRACT

A 31-year-old woman, gravida one, para zero, at 32 weeks, 4 days gestation, with a history of antiphospholipid antibody syndrome, mitral valve replacement requiring anticoagulation, chronic diastolic heart failure, and systemic lupus erythematous was admitted to the hospital for worsening cardiac decompensation with superimposed pneumonia. She was on warfarin for anticoagulation at the time of hospital admission and eventually started on an intravenous heparin infusion. Cesarean delivery was planned due to comorbidities and anticoagulation status. After administration of betamethasone for fetal lung maturity, the patient's heparin infusion was discontinued approximately 16 hours prior to cesarean delivery. Upon obtaining laboratory testing that confirmed appropriate coagulation status, a low-dose combined spinal epidural anesthetic technique was used for cesarean delivery and the expected hemodynamic shifts due to spinal anesthesia were mitigated with a prophylactic norepinephrine infusion.

KEYWORDS Analgesia; anesthesia; conduction; anesthesia; obstetrical; cesarean section

Neuraxial anesthesia is the recommended technique for cesarean delivery[1] but carries the risks of hypotension, infection, and, rarely, spinal hematoma.[2] Patients with preexisting cardiac conditions are susceptible to the deleterious effects of sympathectomy arising from spinal anesthesia, while patients with coagulopathy have an increased risk of spinal hematoma with spinal anesthesia. We present a patient with a history of systemic lupus erythematosus, lupus anticoagulant, and mechanical prosthesis in the mitral valve position with worsening heart failure and pneumonia who presented for cesarean delivery.

CASE DESCRIPTION

A 31-year-old woman, gravida one, para zero, at 32 weeks, 4 days gestation, with a body mass index of 26.7 kg/m^2, was admitted to the hospital for worsening cardiac decompensation with superimposed pneumonia. Her medical history was notable for systemic lupus erythematosus, antiphospholipid antibody syndrome, mitral valve replacement with a mechanical valve requiring continuous systemic anticoagulation with warfarin, and chronic diastolic congestive heart failure (New York Heart Association class II). An echocardiogram demonstrated normal left ventricular cavity size and mild global hypokinesis with a left ventricular

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ejection fraction of 46%. The patient had a SARS-CoV-2 test that did not show infection, and her pneumonia was empirically treated with azithromycin and ceftriaxone. She received a 2-day course of betamethasone to facilitate fetal lung maturity, in anticipation of preterm cesarean delivery. She was transitioned from warfarin to a heparin infusion to maintain therapeutic anticoagulation, and the infusion was discontinued approximately 16 hours prior to the scheduled cesarean delivery. On the morning of surgery, coagulation studies demonstrated an elevated activated partial thromboplastin time of 73.8 seconds but a normal anti-Factor Xa level of <0.1 IU/mL. The hematology service attributed the elevated activated partial thromboplastin time to the patient's prior history of having lupus anticoagulant and made the assessment that surgery and neuraxial anesthesia could be safely conducted due to the normal anti-Factor Xa level.

The patient had a scheduled elective cesarean delivery, and combined spinal epidural anesthesia was performed. Hyperbaric bupivacaine 7.5 mg was administered into the intrathecal space followed by placement of an epidural catheter, and a continuous norepinephrine infusion was started at 0.02 mcg/kg/min. The initial neuraxial dermatome level was T9 when checked by pinprick. Lidocaine 2% was administered through the epidural catheter in two sequential 5 mL aliquots, and a T4 dermatome level was eventually obtained. The patient had an uncomplicated intraoperative course and was discharged home on the fourth postoperative day.

DISCUSSION

To our knowledge, this is the first report describing a parturient with systemic lupus erythematosus and mechanical prosthesis in the mitral valve position who presented for cesarean delivery. Anti-phospholipid syndrome is a systemic autoimmune disease characterized by arterial or venous thrombosis mediated by antibodies to phospholipids[3] and results in a hypercoagulable state.[4] Previous accounts of pregnant patients with mechanical heart valves reported a 43% complication rate that included valve thrombosis and systemic anticoagulation that resulted in uterine hemorrhage.[5,6] To balance the risk of thrombus with the risk of bleeding, a heparin infusion was used during the hospitalization to bridge the patient to cesarean delivery. The American Society of Regional Anesthesia recommends discontinuation of a heparin infusion 4 to 6 hours prior to a neuraxial procedure and confirmation of normal coagulation lab values,[7] and we chose to discontinue the infusion 16 hours before the surgical procedure to ensure that the patient would meet criteria for surgery. On the day of surgery, there was discordance between the activated partial thromboplastin time and the anti-Factor Xa level. The consultant hematologist made the assessment that the anti-Factor Xa was a more accurate indicator of the patient's coagulation status[8] and that the elevated activated partial thromboplastin time was artifactually elevated due to a preexisting lupus anticoagulant and did not recommend thromboelastography.

Single-shot spinal anesthesia can cause an abrupt decrease in systemic blood pressure due to rapid blockade of sympathetic nerve fibers arising from thoracic spinal nerve roots.[9] To balance the competing goals of achieving a dense surgical block and maintaining hemodynamic stability, we decided to perform a low-dose combined spinal epidural anesthetic.[10] We were able to employ a low dose of intrathecal bupivacaine to provide a reliable surgical block with limited hypotension and we extended the block with incremental administration of lidocaine 2% through the epidural catheter.

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